Creating A Clean, Affordable and Resilient Energy Future For the Commonwealth

DOER
Massachusetts Department of Energy Resources

MASSACHUSETTS LEADING BY EXAMPLE PROGRAM
PUBLIC LEADERSHIP, STEWARDSHIP, COMMITTMENT

Leading by Example Council Meeting

March 8, 2016

Agenda

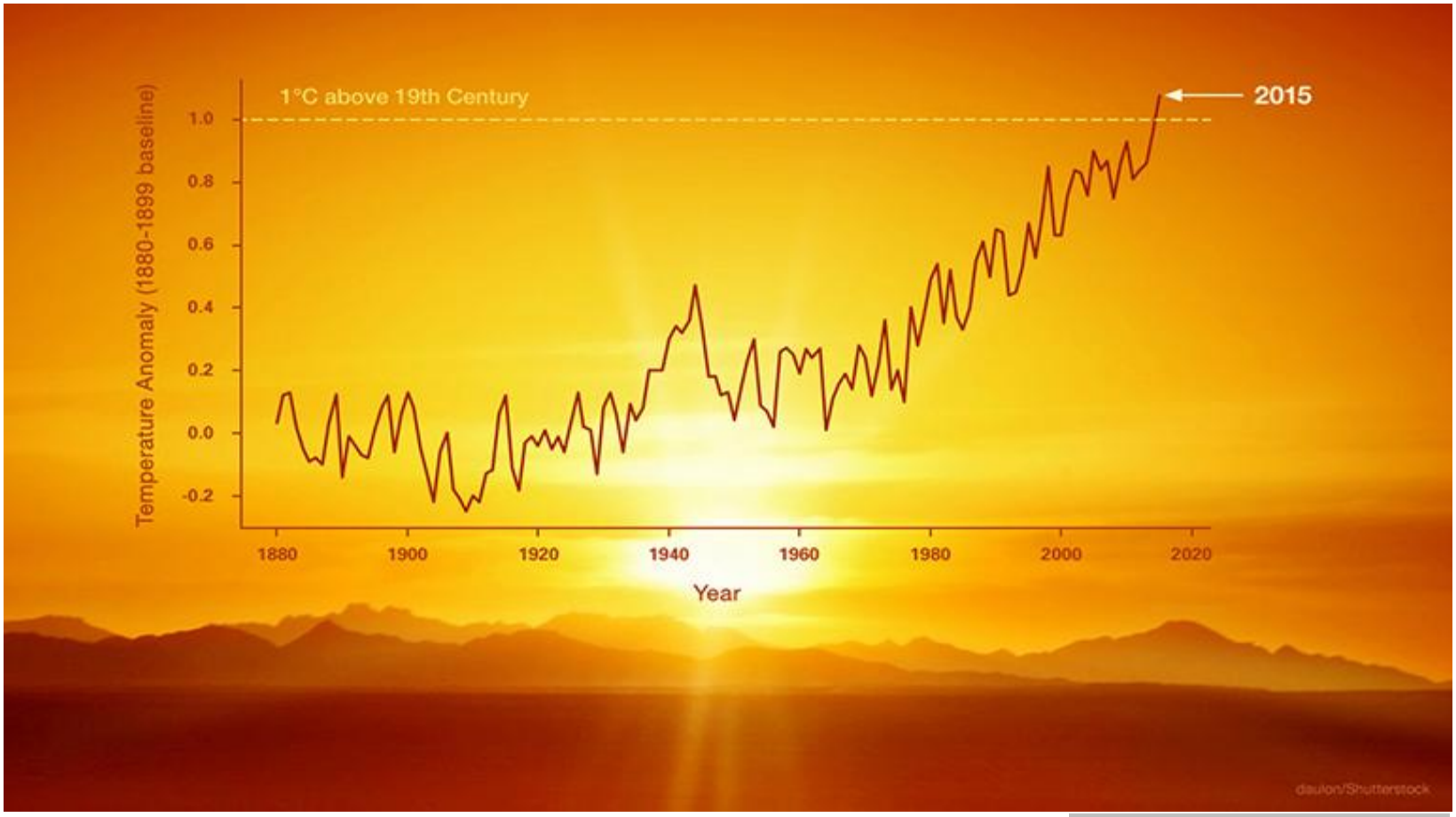
- Welcome and Introductions
- General Information
- MA Policy Updates
- Solar Updates
- DCAMM Updates
- LBE Partner Spotlights
- Employee Sustainability Opportunities
- LBE Updates
- Upcoming Events

MASSACHUSETTS LEADING BY EXAMPLE PROGRAM

PUBLIC LEADERSHIP, STEWARDSHIP, COMMITTMENT

General Information and Updates

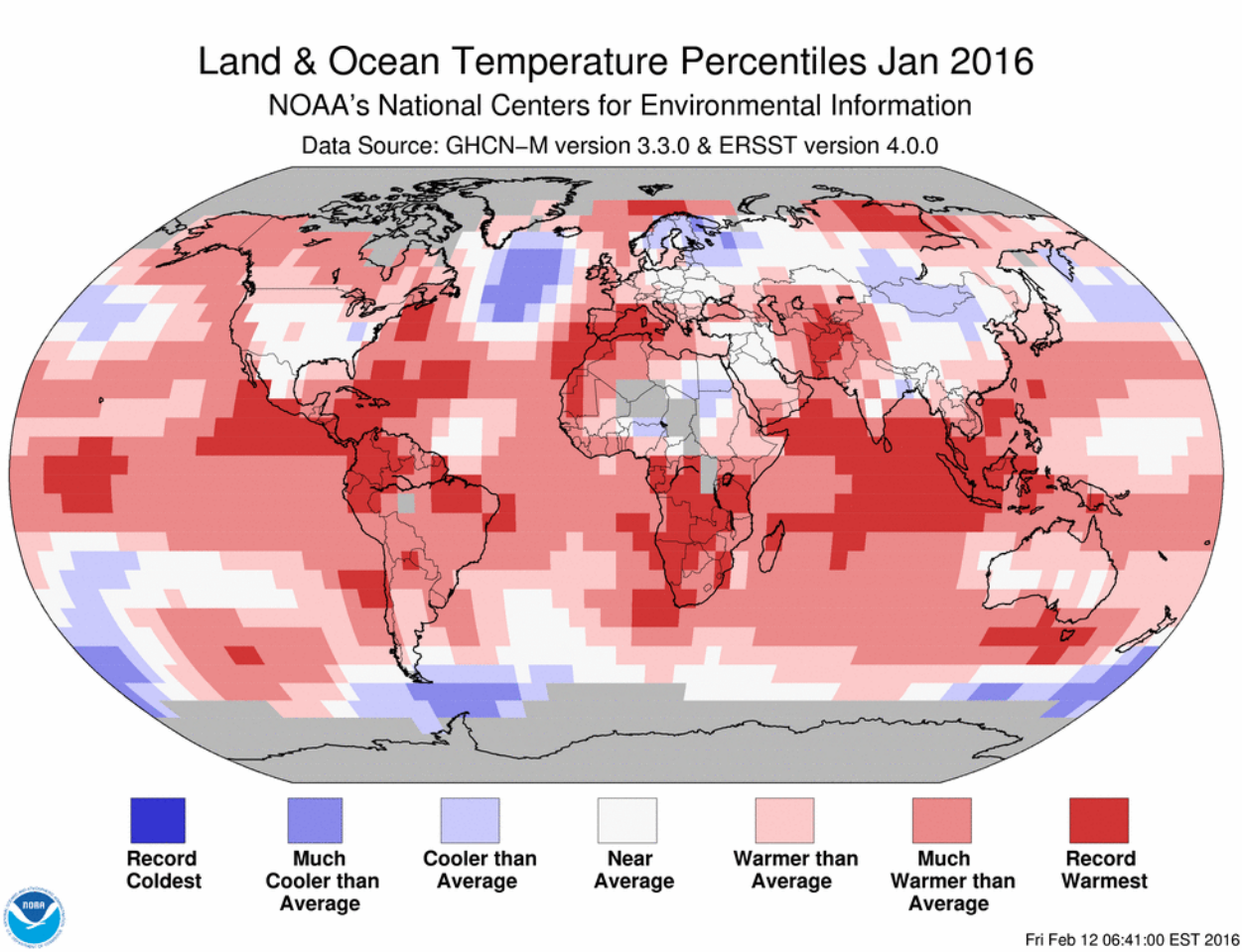
First the Bad News…Global Temperatures



Source: NASA, 2016

"Globally-averaged temperatures in 2015 shattered the previous mark set in 2014 by 0.23 degrees Fahrenheit (0.13 Celsius). Only once before, in 1998, has the new record been greater than the old record by this much."

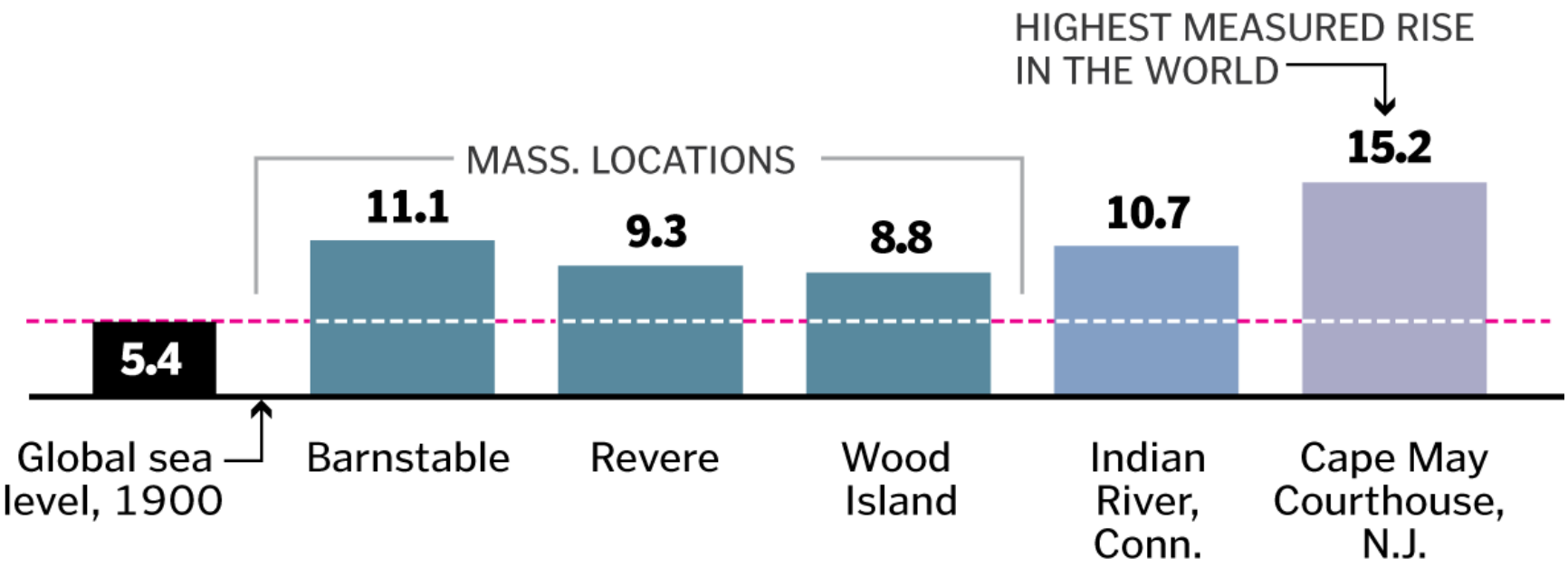
January 2016 Global Temperatures



"January 2016 also marks the ninth consecutive month that the monthly temperature record has been broken." (NOAA, 2016)

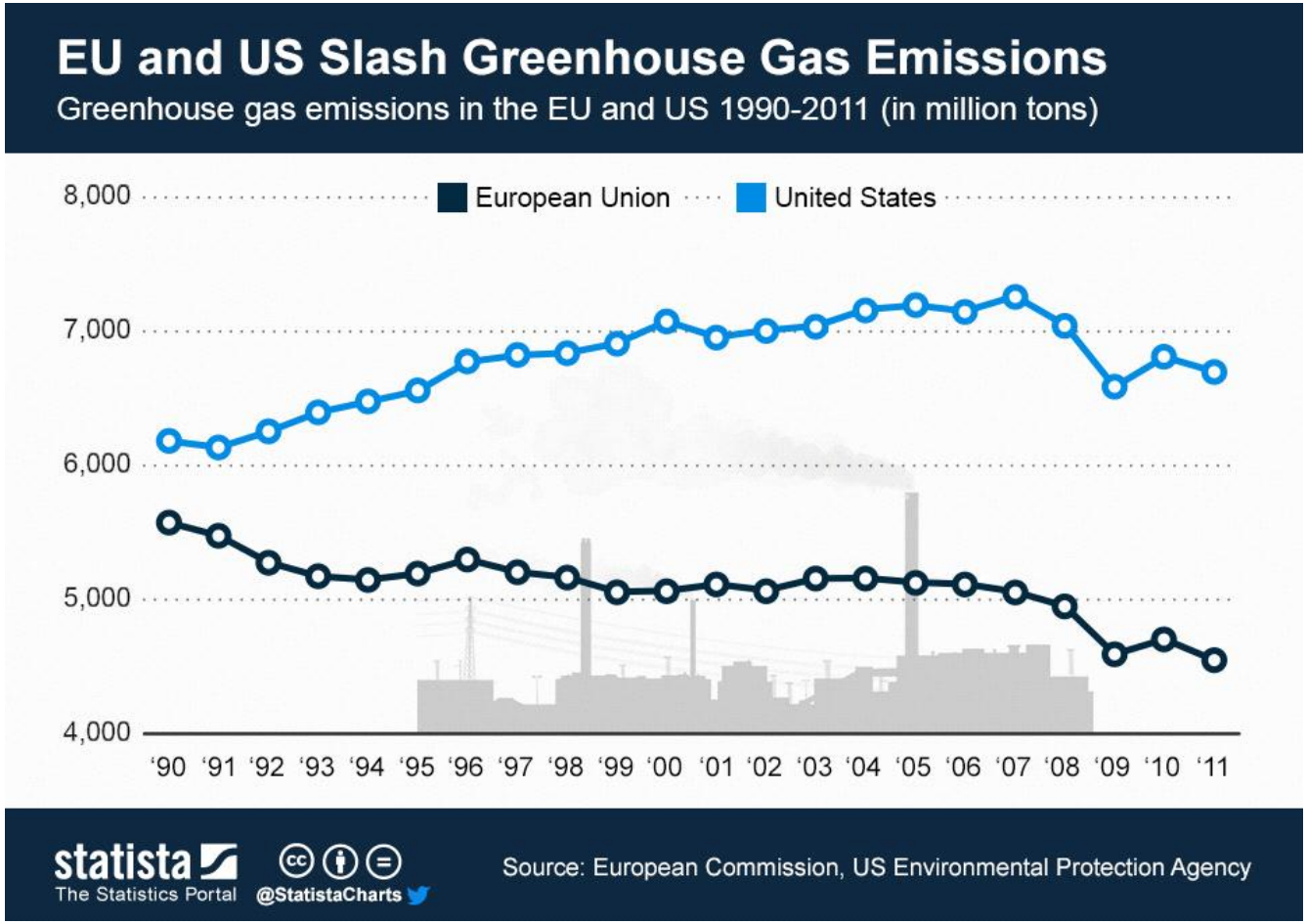
Global Sea Level Rise

1900 to 2000
(inches)

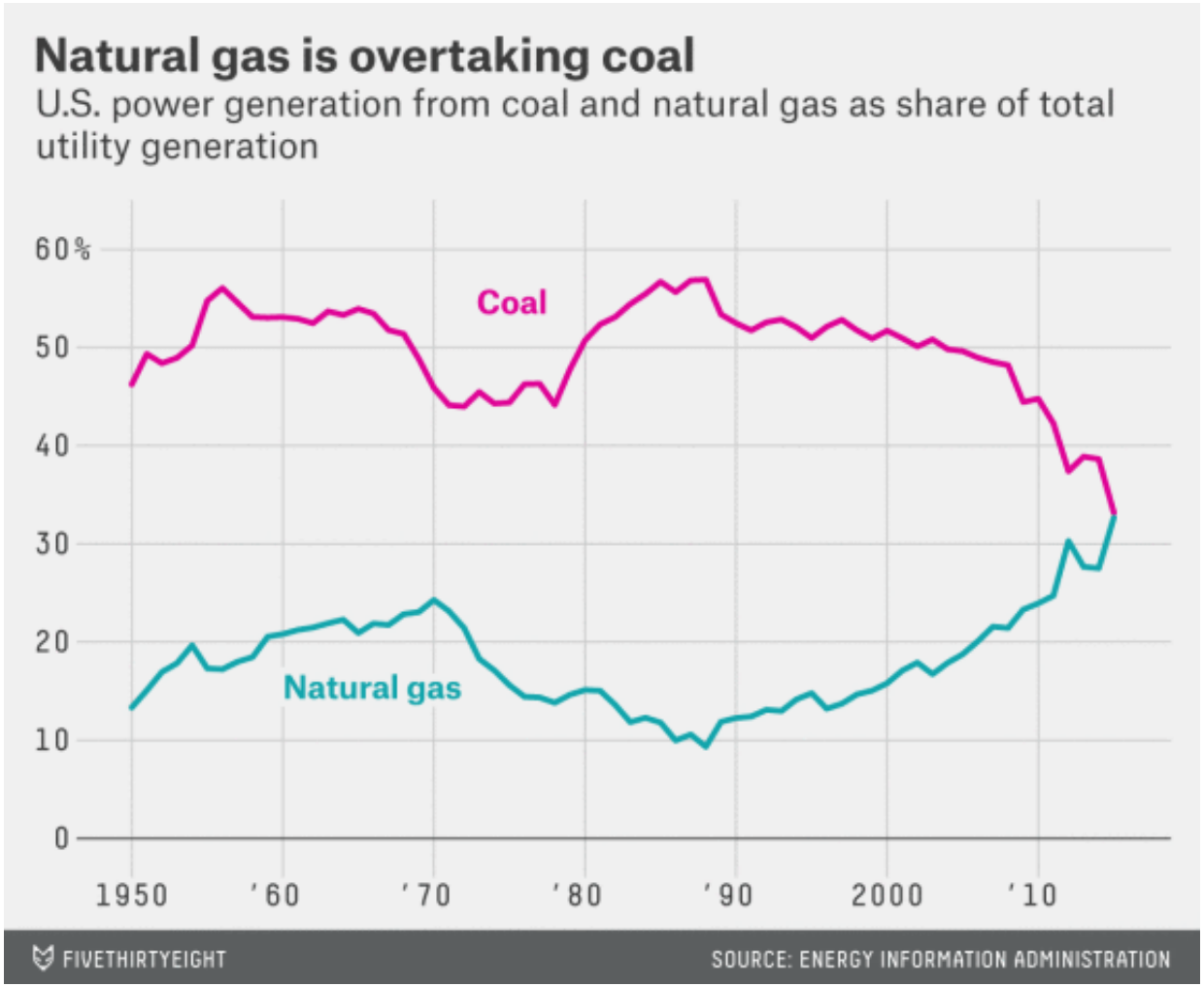


Source: Boston Globe, 2016

And Now the Good News…GHG Reductions



Reduction in Coal Power Generation

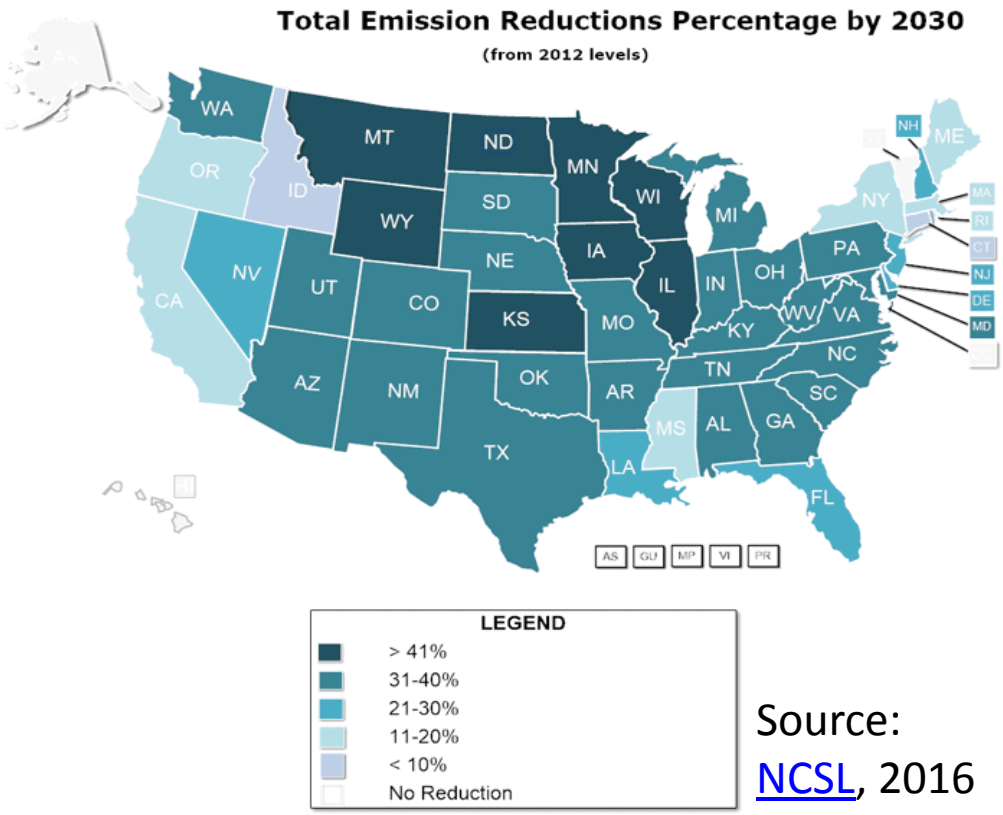


Clean Power Plan Status

- **August 2015**
- EPA Clean Power Final Rules announced
- State-based plan model to reduce carbon emissions from power plants

February 2016

- Supreme Court stayed Plan's implementation pending judicial review
- Rule on hold not overruled
- A number of states continuing to plan for compliance



Source: NCSL, 2016

EPEAT Assessment Tool

- Electronic Product Environmental Assessment Tool
- Searchable database of energy performance
- Includes computers, imaging equipment, TVs

	epeat BRONZE	epeat SILVER	epeat GOLD	Total
Desktops	8	38	152	198
Monitors	0	205	651	856
Notebooks	10	187	407	604
Integrated Desktop Computers	0	16	66	82
Workstations	0	9	24	33
Thin Clients	0	31	16	47
Tablets/Slates	0	70	188	258
Signage Displays	0	24	0	24
Totals	18	580	1504	2102

MA Policy Updates

Governor Baker Joins Bipartisan Accord

- **February 2016**: Signed *Governor's Accord for a New Energy Future*
- Bipartisan group of 17 governors, representing 127 million Americans
- Accord includes commitment to:
  - Diversify energy generation and expand clean energy sources
  - Modernize energy infrastructure
  - Encourage clean transportation options
- More information

Affordable Access to Clean and Efficient Energy

- DOER and MassCEC $15 million collaboration for renewable energy
- Coordination with Energy Efficiency Programs via 3-Year Efficiency Plans
- Inter-secretariat Working Group for implementation in development (DOER & DHCD)

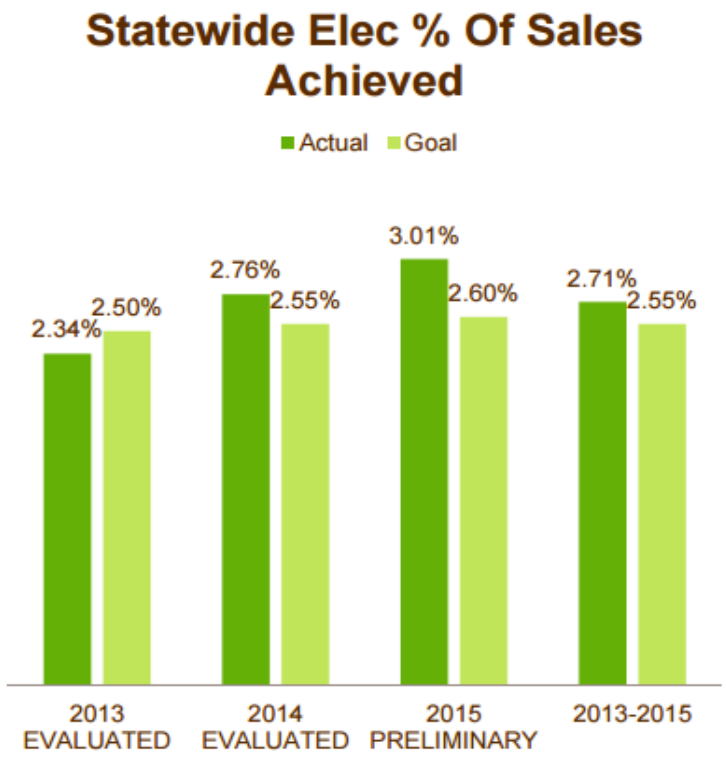
DOER
Massachusetts Department of Energy Resources

3-Year Energy Efficiency Plans Approved

- DPU approved in January
- Previous 3-Year Plans exceeded savings goal
- Over $8 billion in economic, environmental, and energy benefits
- Key priorities:

  Demand reduction and commitment to innovative technologies

Results of 2013-2015 Plans



MA ENERGY EFFICIENCY ADVISORY COUNCIL

Creating A Clean, Affordable and Resilient Energy Future For the Commonwealth

DOER Massachusetts Department of Energy Resources

MA #3 in LEED Buildings

- Up two spots from #5 in 2014
- 8 state buildings certified in 2015
- Includes LEED Platinum certification for DFW HQ in Westborough

2015 Top 10 State for LEED

Rank	State	Gross Square Footage (gsf)	Per Capita Certified GSF	Total No. Projects
1	IL*	43,979,595	3.43	161
2	MD*	17,659,881	3.06	127
3	MA*	19,850,624	3.03	112
4	WA	17,450,321	2.60	101
5	CO*	12,218,992	2.43	95
6	NV	6,534,960	2.42	30
7	CA*	87,358,563	2.34	618
8	TX	52,445,321	2.09	237
9	VA*	13,005,968	1.63	121
10	UT	4,494,301	1.63	31
**	DC	11,612,237	19.30	84

**Included in 2014 Top 10 States for LEED list*

***Washington, D.C. is not ranked because it is a federal district, not a state*

Solar Update
SREC II Status and Review Process

- 1600 MW goal by 2020
- As of 2/25/16, installed capacity + SRECII applications (for large projects) exceeded 1600 MW target
- SRECII now not available for new projects
- DOER reviewing applications on a first-come, first-served basis
- Incomplete applications that have not been corrected will be removed from list
- DOER to announce projects in SRECII program relatively soon
- Planning for “SREC III” underway

DIVISION OF CAPITAL ASSET MANAGEMENT & MAINTENANCE

DCAMM LBE Updates

03 | 08 | 2016

KEY METRICS

Active Energy Projects

Energy Project Type	# of Sites	Estimated Project Cost	Projected Savings
Comprehensive (Comp)	103	$ 381,922,102	$ 25,712,288
Towards Zero Net Energy (TZNE)	10	$ 57,094,269	$ 3,298,039
Retro-Commissioning (Rx)	30	$ 19,797,547	$ 1,843,792
Utility Vendor (UV)	455	$ 12,305,500	$ 2,861,807
New Review (New Rev.)	22	$ 12,728,021	$ 1,212,811
Other	33	$ 639,300	$ 2,779,525
Evaluated NA (N/A)	105	$ -	$ -
Total	**758**	**$ 484,486,739**	**$ 37,708,262**

All projects in AEP or started since 2012. For project type descriptions, see Appendix.

Q3-Q4 2015 Results

Project Progress

- **2** sites reached Substantial Completion
- **16** sites began Implementation
- **8** sites Completed Audits
- **2** sites began Procurement
  - Fitchburg State University (Fitchburg)
  - Roxbury Community College (Boston)

Major Accomplishments

New Facility Advisors Contract Awarded

- 70 companies tentatively selected for statewide contract

New Solar PV Maintenance Contract Awarded

- 2 companies tentatively selected for statewide contract

New House Doctor Contract Awarded

- 4 New companies selected

New Fisheries and Wildlife HQ Awarded LEED Platinum

2nd Round of CoFFEE Project Proposals Received

New Memorandum of Understanding Signed with Utility Providers for ECM Incentives

Commonwealth Facility Fund for Energy Efficiency (CoFFEE)

- First CoFFEE Program Project Completed: Greenfield Community College (GCC) replaced 392 T8 lighting fixtures with LEDs.
  - The project cost $63,000 and is expected to save $14,000, over 92,000 kWh annually.
- A portion of the savings from the project will be put back into the revolving loan fund to be distributed for future projects.

CoFFEE Facts

- Year Created: 2015
- Fund Size: $500,000
- Grant Size: $10,000 - $90,000
- Administrative Fee: Average 6%
- Payback Period: Max. 5 years
- Repayment: 45% of savings per year during payback period

CoFFEE Benefits

- Low cost fund to finance small and medium sized sustainability projects
- Fosters innovative energy and water efficiency projects at Commonwealth facilities
- Reduces costs, utility usage and associated environmental impacts

Commonwealth Energy Intelligence

- DCAMM is currently in contract negotiation with Enernoc
    - 1. Enernoc was selected by a team made up of Facility managers, Energy managers, DOER, and DCAMM
    - We expect a contract to be signed in the next 2 weeks.
- The CEI Advisory council will have its inaugural meeting on Monday. This advisory council is made up of the same members that were on the selection team. If you are interested in participating please email Krista Lillis, Program Manager (krista.lillis@state.ma.us)
- Once the contractor is executed, Krista will be reaching out to all facilities that participated in the EEMS program. DCAMM will be requesting to meet with appropriate staff at your facility to discuss the benefits and drawbacks of the previous system. We have contracted with the vendor to provide each site with individualized reports and training that address your specific site needs- they are not boiler plate. We will be starting these meetings one week after contract signing.
- There will be multiple individuals assigned directly to this program on the State and vendor side- allowing us to focus on ensuring the program meets your needs and saving opportunities are realized.
- If you have any questions, comments or thoughts on the program, please do not hesitate to email Krista.

AEP Certifications

(2/3 of target metrics must be reached)

- **Bridgewater State – Certified 01/08/2016**
  - **31%** Energy Use reduction (25% target) (2014 value, compared to 2004 baseline)
  - **30%** GHG Emissions reduction (25% target) (2014 value, compared to 2004 baseline)
  - **62%** Energy Costs reduction (25% target) (2014 value, compared to 2004 baseline)
- **Holyoke Soldiers' Home – Certified 03/01/2016**
  - **40%** EUI reduction (25% target) (2012-2014 EUI, compared to 2004-2006 baseline)
  - **54%** GHG Emissions reduction (25% target) (2012-2014 EUI, compared to 2004-2006 baseline)
  - **13%** Energy Costs reduction (25% target) (2012-2014 EUI, compared to 2004-2006 baseline)

LBE Partner Spotlights

UMassAmherst

Sustainable UMASS

UMass Amherst
Solar Projects

LBE Presentation – March 8, 2016

Ezra Small

Campus Sustainability Manager

CHP Solar Thermal Project

- Completed February 19, 2016
- Installer: New England Solar Hot Water, Duxbury, MA
- Feasibility/Designer/ Mechanical Engineer: BEAM Engineering, Wakefield, MA
- Purchasing: UMass Utilities/CHP

CHP Solar Thermal Project

- Feasibility Study: August 2013
- Installation: October 2015-February 2016

- Function: Pre-heat RO make-up water from 50,000 gallon condensate tank at CHP

CHP Solar Thermal Project

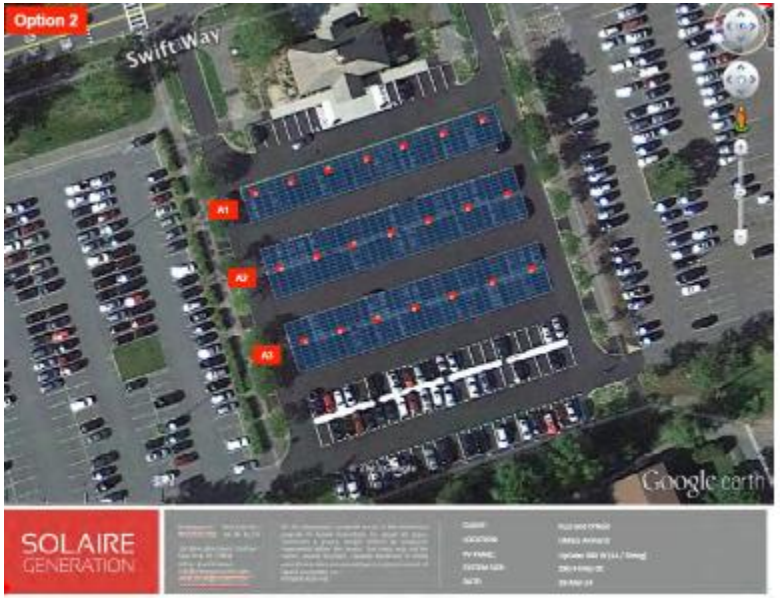
Savings

- Thermal Savings: 346,162 kBTU/yr
- Fuel Savings: 2,800 Therms/yr
- Cost Savings: ~$5,000/yr

Cost

- Design & Install Cost: $139,880
- DOER Clean Energy Grant: $74,718
- MassCEC Rebate: $65,162
- Installation cost to UMass: $0

Robsham Visitor Center Solar Canopy

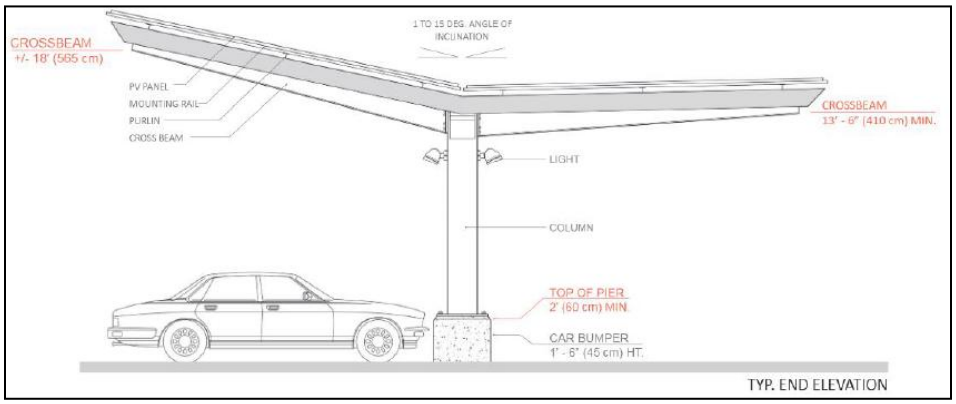


- Completed February 19, 2016
- Designer/Architect: Fuss & O'Neil, W.Springfield, MA
- Contractor: RAC Builders, Agawam, MA
- Electrical: M.L. Schmidt, Springfield, MA
- Canopy Manufacturer: Solaire/SunPower, Boston, MA

Robsham Visitor Center Solar Canopy

- Size: 336kW DC, 192 kW AC
- Est Annual Production: 330,639 kWh
- Number of UpSolar PV Modules: 1,008
- Number of AE Inverters: 12
- EV's: Fast Charger and 2 Duel Level II Chargers

Robsham Visitor Center Solar Canopy



- Duel incline structures that feature an integrated decking and gutter system designed to manage rain and snow
- Contributes to campus electrical grid, electric vehicle charging stations, LED Lights
- Each canopy: 180 x 39 ft., 13.5 feet clearance

Robsham Visitor Center Solar Canopy

- Owned and Operated by UMass Amherst

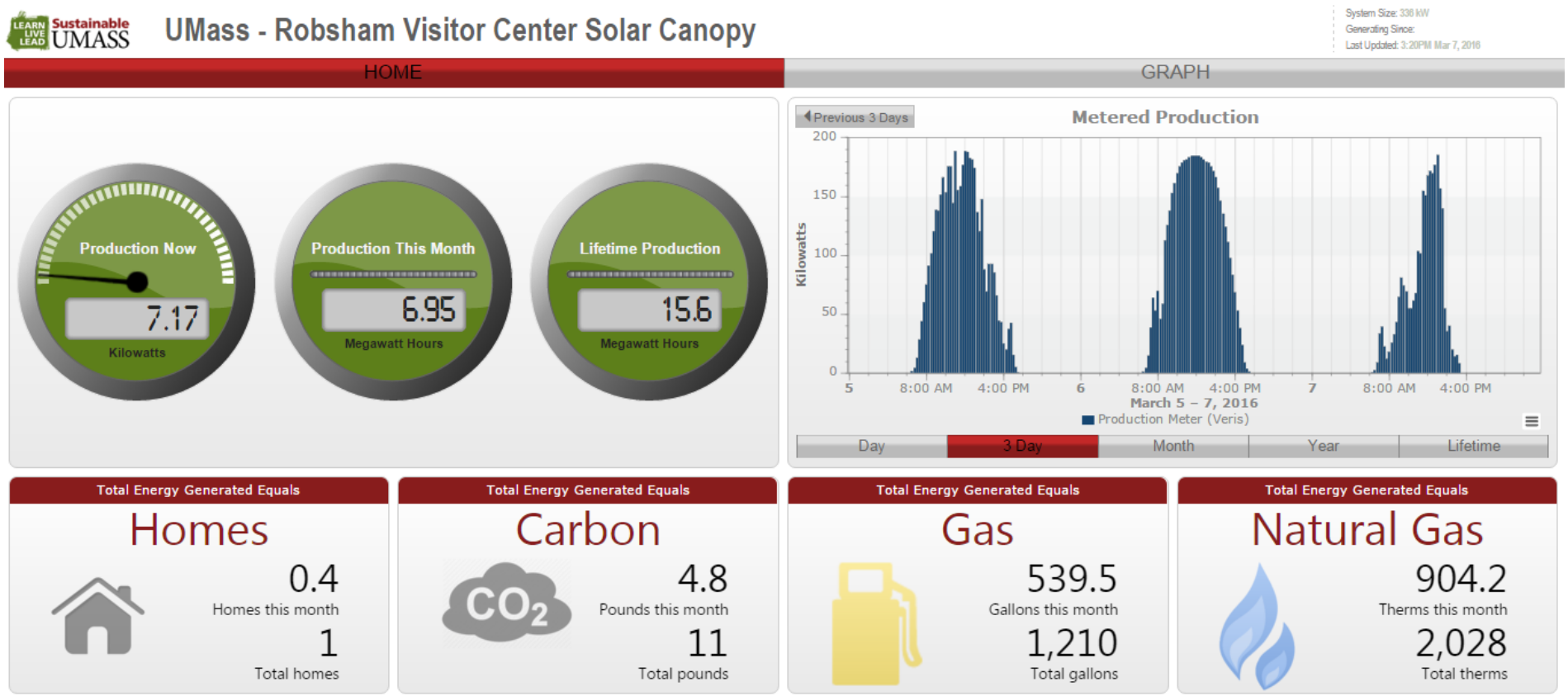
Savings:

- 20 Year Emissions Avoided: 2,000 MT
- 20 yr SREC II Revenue: $848,000
- 20 yr Avoided Electricity Costs: $898,000

Cost

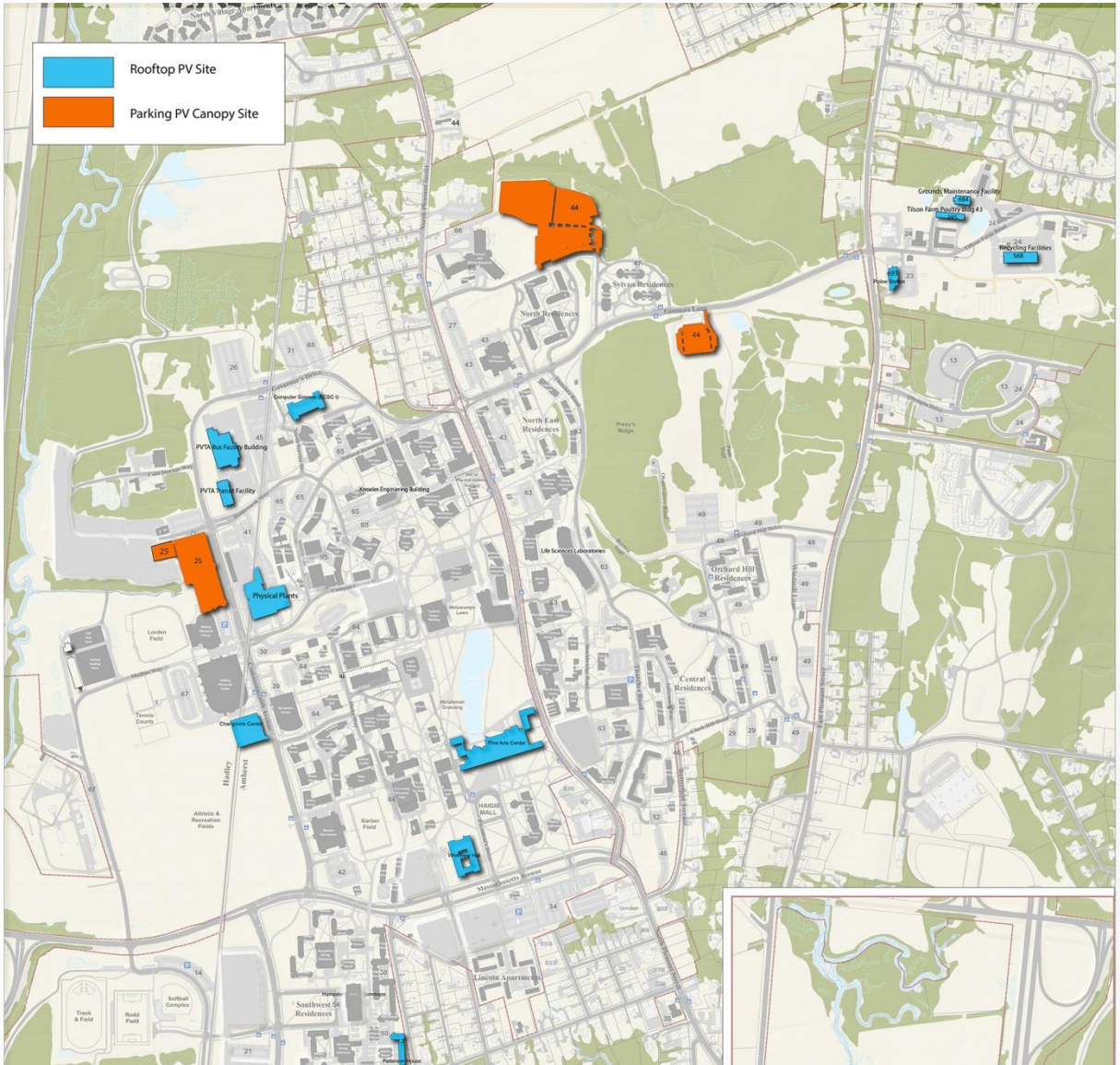
- DOER Clean Energy Grant: $146,000
- UMA Design & Install Cost: $1,500,000
- Estimated Payback: 14 years

Robsham Visitor Center Solar Canopy



Dashboard Link:
https://apps.alsoenergy.com/kiosk/36042?dashkey=2a56697350656d6e4541304b772b71453d&tag=559362

Phase II – 2016 Campus Wide RFP– 4.1 MW – Power Purchase Agreement (PPA)

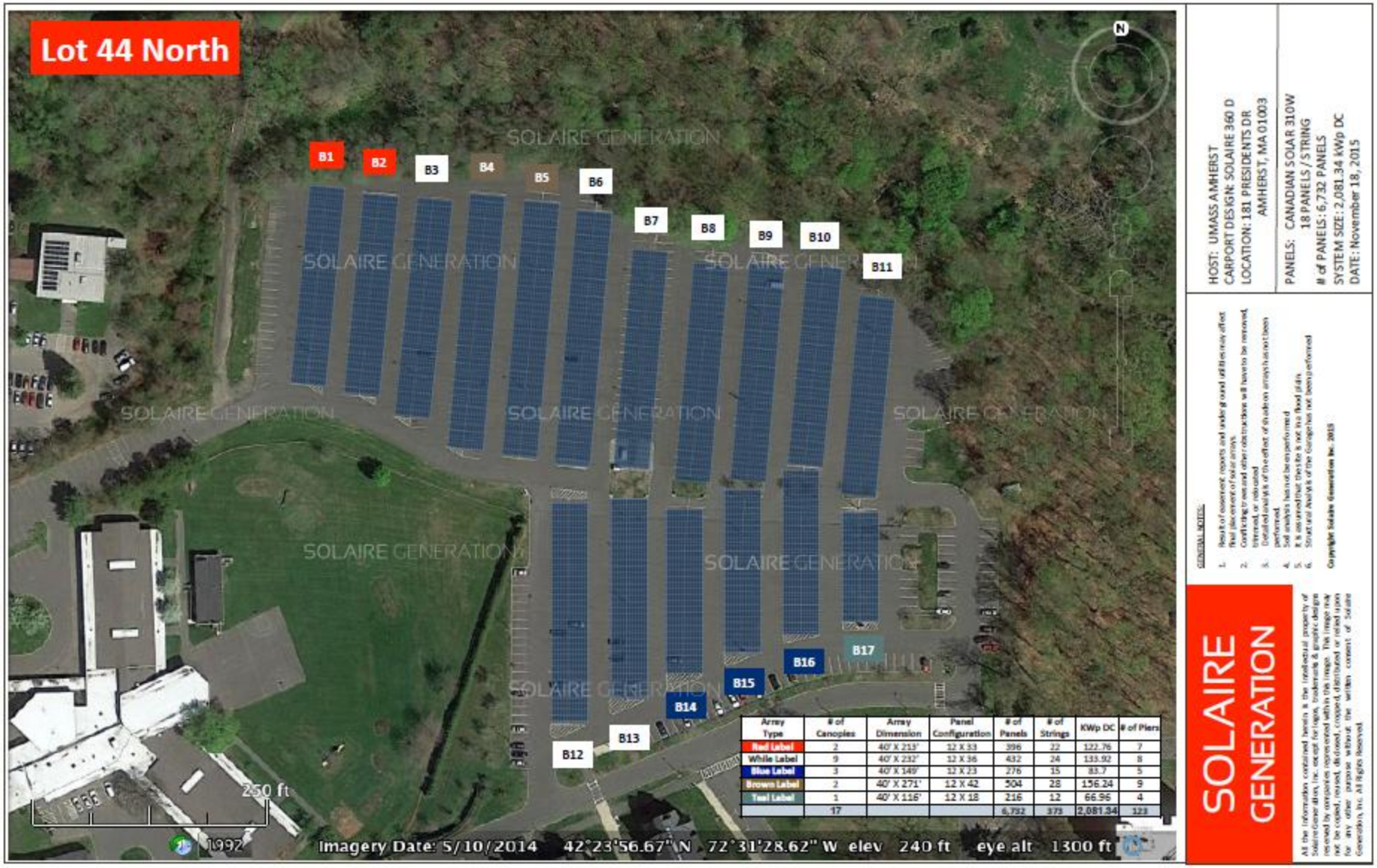


This is the final list from UMass mtg on 12.10.15.

These system sizes and production numbers are being incorporated into Exhibit 2

Solar RFP Final Site List

	UMass Solar Locations			
Site Name	**System Size kW DC**	**System Size kW AC**	**Production**	**Eastside or Westside**
Lot 25 (without handicapped spaces)	1,927.20	1,444	2,158,508	West
Recreation Center	241.92	202	295,142	West
Computer Science	154.67	131	187,144	West
Champion Center	249.80	200	304,749	West
TOTAL WEST SIDE	**2,573.58**	**1,977**	**2,945,543**	**West**
Lot 44 North (Pending final design)	2,575.44	1,840	2,884,492	East
FAC Bridge	157.17	123	204,321	East
Police Station	30.87	28	37,661	East
TOTAL EAST SIDE	**2,763.48**	**1,991**	**3,126,474**	**East**
Bus Maintenance (Eversource Grid)	183.65	154	224,046	Eversource
TOTAL CAMPUS	**5,520.71**	**4,122**	**6,296,063**	**East and West**



Array Type	# of Canopies	Array Dimension	Panel Configuration	# of Panels	# of Strings	KWp DC	# of Piers
Red Label	2	40' X 213'	12 X 33	396	22	122.76	7
White Label	9	40' X 232'	12 X 36	432	24	133.92	8
Blue Label	3	40' X 149'	12 X 23	276	15	83.7	5
Brown Label	2	40' X 271'	12 X 42	504	28	156.24	9
Teal Label	1	40' X 116'	12 X 18	216	12	66.96	4
	17			6,732	373	2,081.34	123

HOST: UMASS AMHERST
CARPORT DESIGN: SOLAIRE 360 D
LOCATION: 181 PRESIDENTS DR
AMHERST, MA 01003

PANELS: CANADIAN SOLAR 310W
18 PANELS / STRING
# of PANELS: 6,732 PANELS
SYSTEM SIZE: 2,081.34 kWp DC
DATE: November 18, 2015

GENERAL NOTES:

1. Result of easement reports and underground utilities may affect final placement of solar arrays.
2. Conflicting trees and other obstructions will have to be removed, trimmed, or relocated.
3. Detailed analysis of the effect of shadows on arrays has not been performed.
4. Soil analysis has not been performed.
5. It is assumed that this site is not in a flood plain.
6. Structural Analysis of the Canopies has not been performed.

SOLAIRE GENERATION

Array Type	# of Canopies	Array Dimension	Panel Configuration	# of Panels	# of Strings	KWp DC	# of Piers
Red Label	9	40' X 213'	12 X 33	396	22	122.76	7
White Label	4	40' X 174'	12 X 27	324	18	100.44	6
Blue Label	4	40' X 149'	12 X 23	276	15	83.7	5
Teal Label	1	40' X 194'	12 X 30	360	20	111.6	7
	15			5,280	292	1,629.36	95

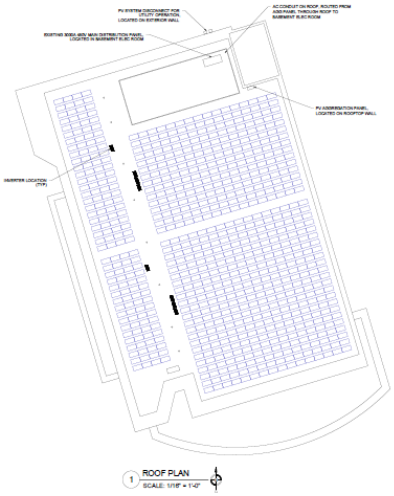
HOST: UMASS AMHERST
CARPORT DESIGN: SOLAIRE 360 D
LOCATION: 181 PRESIDENTS DR
AMHERST, MA 01003

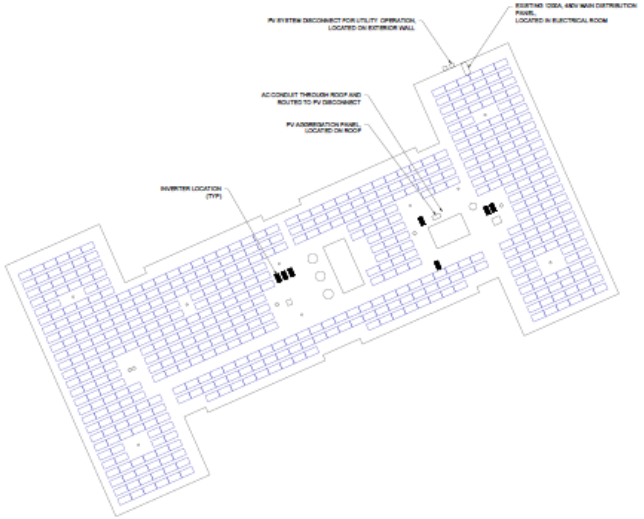
PANELS: CANADIAN SOLAR 310W
18 PANELS / STRING
# of PANELS: 5,280 PANELS
SYSTEM SIZE: 1,629.36 kWp DC
DATE: November 18, 2015

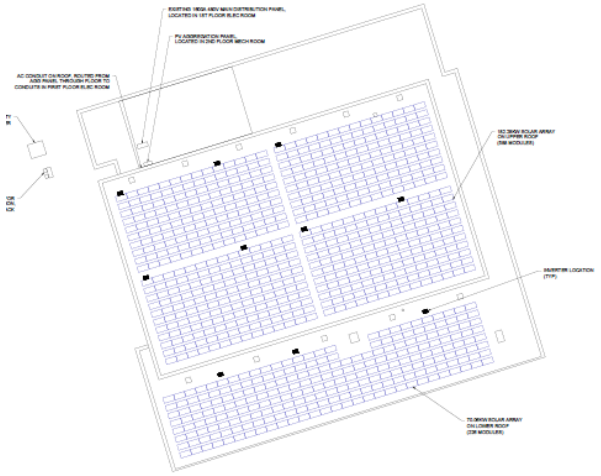
GENERAL NOTES:

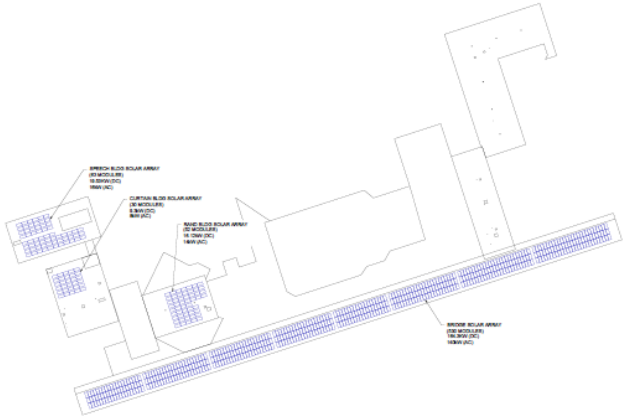
1. Result of easement reports and underground utilities may affect final placement of solar arrays.
2. Conflicting trees and other obstructions will have to be removed, trimmed, or relocated.
3. Detailed analysis of the effect of shadow arrays has not been performed.
4. Soil analysis has not been performed.
5. It is assumed that there is not any flood plain.
6. Structural Analysis of the canopies has not been performed.

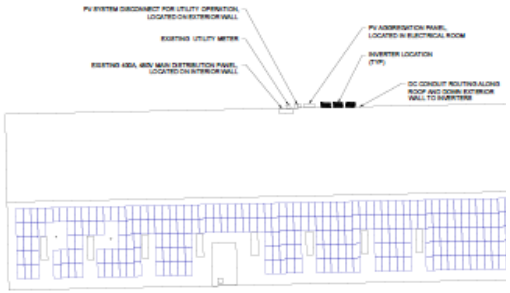
SOLAIRE GENERATION

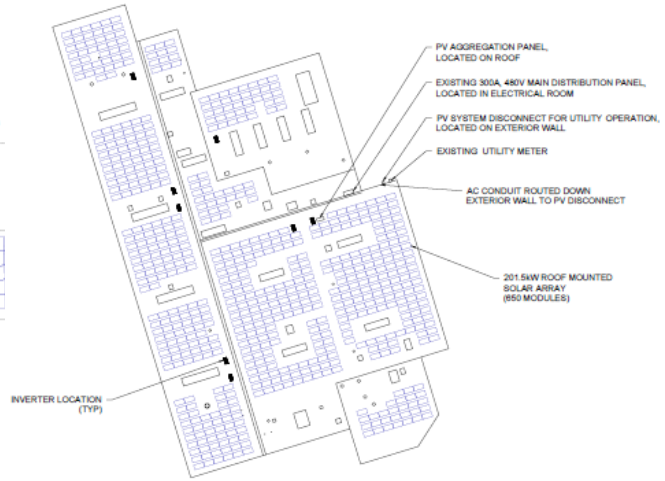

1 ROOF PLAN
SCALE: 1/16" = 1'-0"

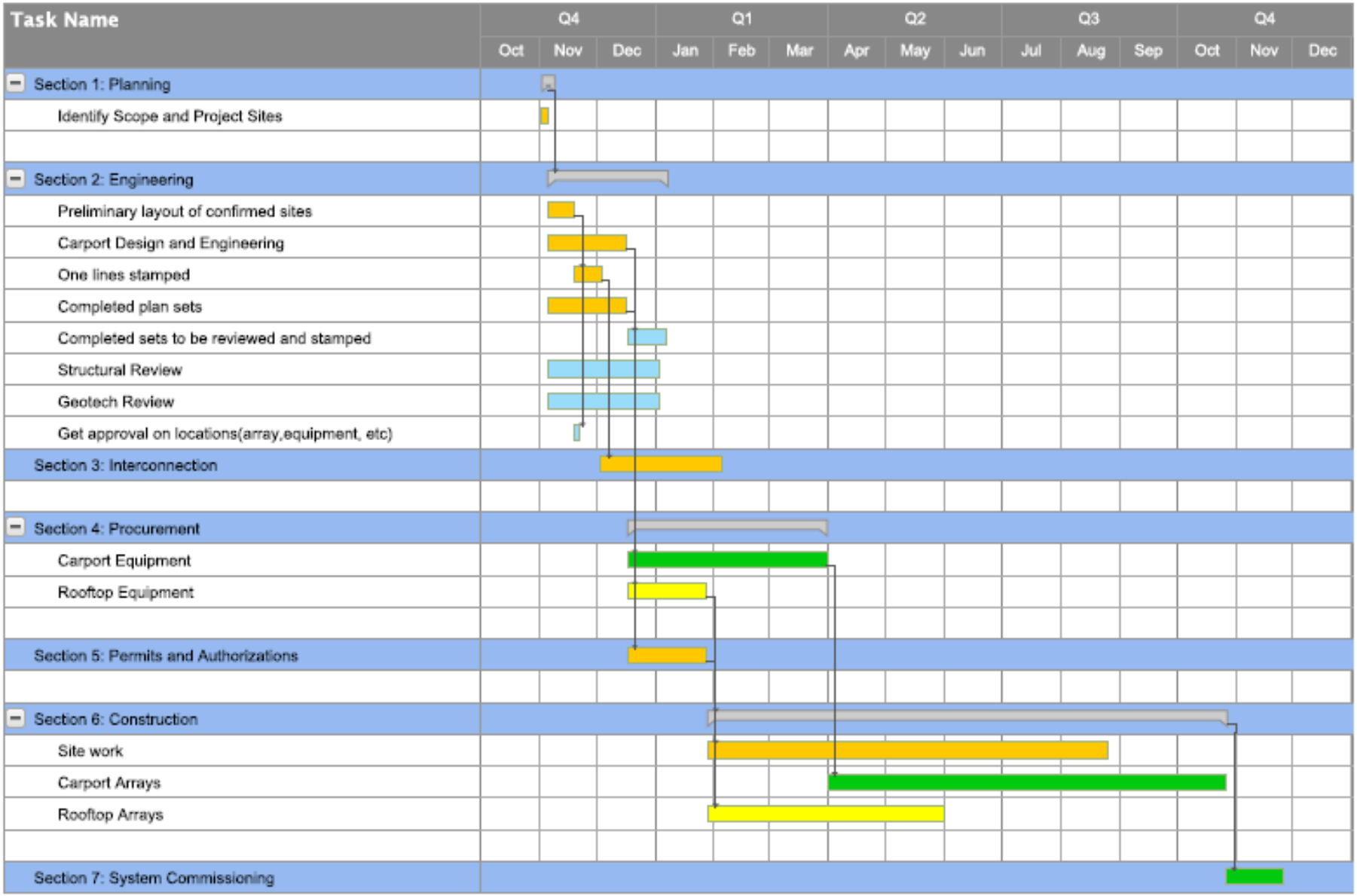

PV SYSTEM DISCONNECT FOR UTILITY OPERATION, LOCATED ON EXTERIOR WALL
EXISTING 1200A, 480V MAIN DISTRIBUTION PANEL, LOCATED IN ELECTRICAL ROOM
AC CONDUIT THROUGH ROOF AND ROUTED TO PV DISCONNECT
PV AGGREGATION PANEL, LOCATED ON ROOF
INVERTER LOCATION (TYP)


EXISTING 1600A 480V MAIN DISTRIBUTION PANEL, LOCATED IN 1ST FLOOR ELEC ROOM
PV AGGREGATION PANEL, LOCATED IN 2ND FLOOR MECH ROOM
AC CONDUIT ON ROOF, ROUTED FROM ADD PANEL THROUGH FLOOR TO CONDUITS IN FIRST FLOOR ELEC ROOM
INVERTER LOCATION (TYP)


BRESCH BLDG SOLAR ARRAY
CURTAIN BLDG SOLAR ARRAY
RAND BLDG SOLAR ARRAY
BROWSE SOLAR ARRAY


PV SYSTEM DISCONNECT FOR UTILITY OPERATION, LOCATED ON EXTERIOR WALL
EXISTING UTILITY METER
EXISTING 400A, 480V MAIN DISTRIBUTION PANEL, LOCATED ON INTERIOR WALL
PV AGGREGATION PANEL, LOCATED IN ELECTRICAL ROOM
INVERTER LOCATION (TYP)
DC CONDUIT ROUTING ALONG ROOF AND DOWN EXTERIOR WALL TO INVERTERS


PV AGGREGATION PANEL, LOCATED ON ROOF
EXISTING 300A, 480V MAIN DISTRIBUTION PANEL, LOCATED IN ELECTRICAL ROOM
PV SYSTEM DISCONNECT FOR UTILITY OPERATION, LOCATED ON EXTERIOR WALL
EXISTING UTILITY METER
AC CONDUIT ROUTED DOWN EXTERIOR WALL TO PV DISCONNECT
201.5kW ROOF MOUNTED SOLAR ARRAY (650 MODULES)
INVERTER LOCATION (TYP)


Task Name
Q4
Q1
Q2
Q3
Q4
Oct
Nov
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Section 1: Planning
Identify Scope and Project Sites
Section 2: Engineering
Preliminary layout of confirmed sites
Carport Design and Engineering
One lines stamped
Completed plan sets
Completed sets to be reviewed and stamped
Structural Review
Geotech Review
Get approval on locations(array,equipment, etc)
Section 3: Interconnection
Section 4: Procurement
Carport Equipment
Rooftop Equipment
Section 5: Permits and Authorizations
Section 6: Construction
Site work
Carport Arrays
Rooftop Arrays
Section 7: System Commissioning

FY 15 Winter Break Shutdown Analysis

Reduction in Energy and Cost

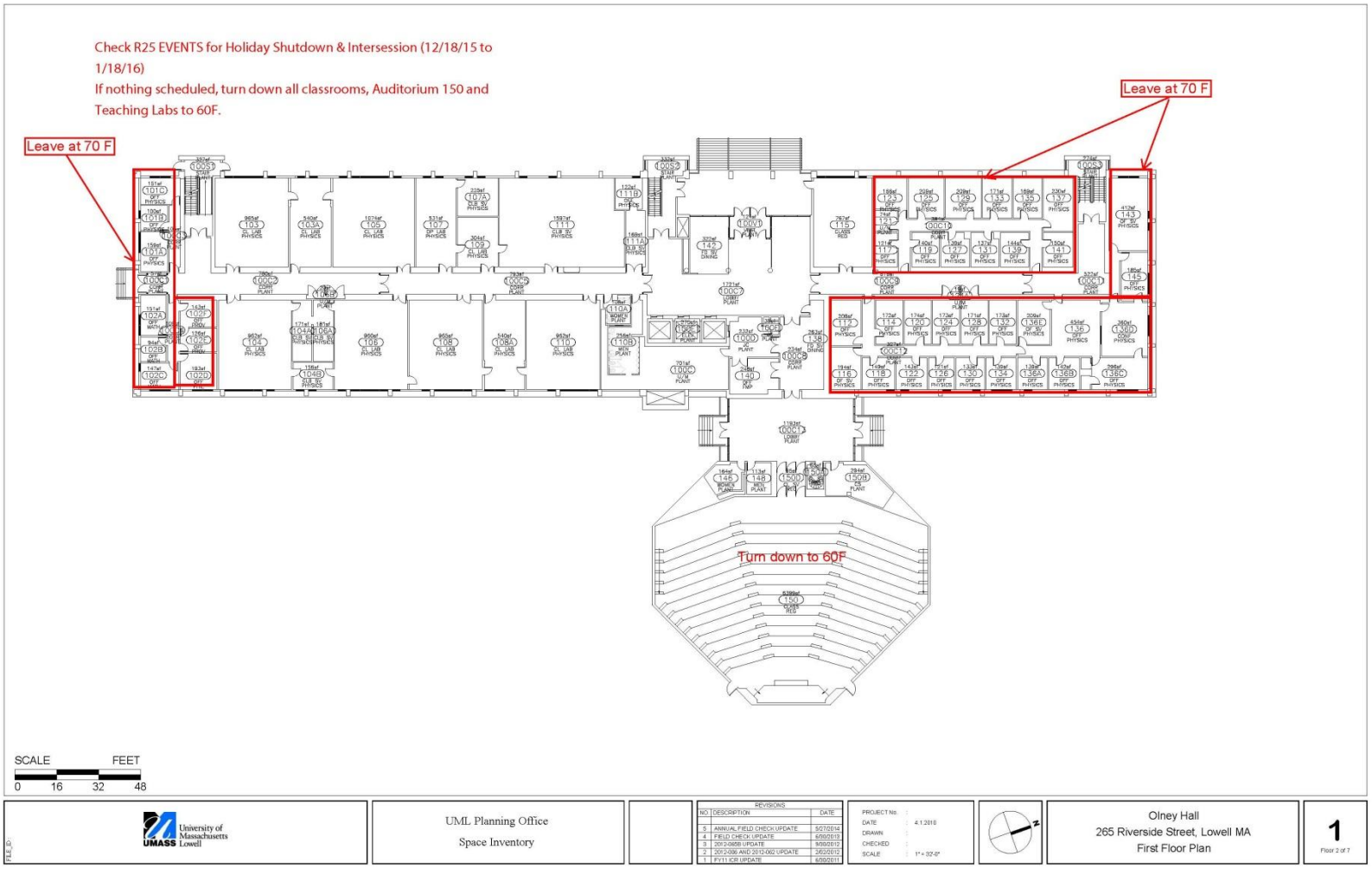
Daniel Orth, Paul Piraino

Introduction

Sub Heading

- From December 19, 2015 to January 19, 2016 UML is on winter break/intersession.
- During the break many buildings are in “unoccupied” mode; or set back to 60 F temps until students return.
- The buildings that are set back are mostly office, academic and residential halls.
- Olney and Olsen Labs – most teaching lab exhaust systems turned off; and temps set 60F
- UCrossing was not shut down as it was used during the break.

A Sample of a Building Shutdown Plan

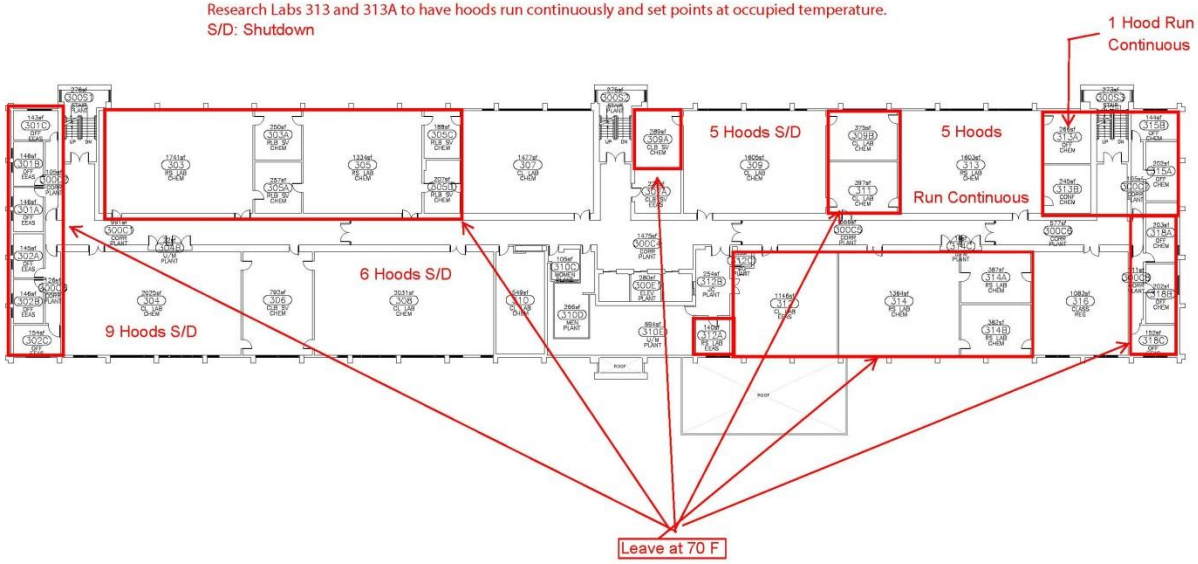


A Sample of a Building Shutdown Plan

Check R25 EVENTS for Holiday Shutdown (12/18/15 to 1/18/16)
If nothing scheduled, turn down all classrooms and Teaching Labs to 60F.

Teaching Labs: Room 306, 307, 307A, 309, 308, 310 Turn down to 60F and hoods fans to be shut down by Chemistry. HVAC shut down 9 hoods in 304.

Research Labs 313 and 313A to have hoods run continuously and set points at occupied temperature.
S/D: Shutdown



SCALE FEET
0 16 32 48

University of Massachusetts Lowell

UML Planning Office
Space Inventory

NO	DESCRIPTION	DATE
4	ANNUAL FIELD CHECK UPDATE	5/27/2014
3	FIELD CHECK UPDATE	6/30/2013
2	2010-348 UPDATE	2/22/2012
1	FY11 ICR UPDATE	6/30/2011

PROJECT No.
DATE 4.1.2010
DRAWN
CHECKED
SCALE 1" = 32'-0"

Olney Hall
265 Riverside Street, Lowell MA
Third Floor Plan

3
Floor 4 of 7

UMASS LOWELL

The Method of Information Gathering

We calculated the savings by comparing what energy usage we would experience if we did not enact shutdown procedures in the buildings as compared to what we actually used.

We used the period prior to the shut down as a control. We then applied normalization by Heating Degree Day (HDD) data for the two periods.

The prior period was from November 17th 2015 to December 18th 2015 to equal 31 days.

The Break Down

Savings due to reduced Gas usage

Building	Normalized % Diff in Usage	HDD Normalized Dollars Saved in usage
S.C.P.P	-21.96%	$ (20,017.07)
East Campus (Enernoc Summary)	-21.91%	$ (16,800.59)
Fox	-46.03%	$ (12,610.51)
N.C.P.P	-3.87%	$ (5,440.29)
ICC	-45.44%	$ (3,947.80)
Tsongas	-7.95%	$ (1,399.59)
Donahue	-18.68%	$ (1,083.78)
Leitch	-28.53%	$ (432.25)
ETIC	-1.00%	$ (252.74)
Usuites	-1.36%	$ (85.47)
Bourgeois	6.30%	$ 296.42
CRC	14.29%	$ 914.50
Wannalancit	33.76%	$ 1,555.04
Ucrossing	19.47%	$ 2,407.18

Savings are based on prior period to winter break shut down

Total overall savings
=
$40,096.36

It should be noted that South Campus Power Plant And North Campus Power Plant heat the academic buildings on South and North.

Sheehy and Concordia are also heated by the South Campus Power Plant

The Break Down

Savings due to reduced electric usage as compared to last Holiday Shutdown.

Building	Cost Difference for 31 days
East Campus	$ (20,922.72)
HSSB	$ (119.57)
North Campus Meter	$ (1,869.84)
South Campus Meter	$ (8,169.91)
Ucrossing	$ (6,240.74)
Usuites	$ 1,256.41
Durgin	$ (976.43)
Riverview	$ 2,431.14

ICC	$(2,520.99)

Total over all additional savings

=

$33,392.97

It should be noted that North, East, and South Campus have main electrical feeds that feed most of the buildings academic and residential

The exception are the buildings separately listed in the table to the left.

ICC uses electric heat. After the data is normalized we see that there is an additional savings. This is accounted for in the above total

Adding It Up

Total energy savings

=

$73,489.33

Compared to the total amount the University spends annually on electricity & gas, this cost reduction is a 1% reduction of FY 16 energy forecast . July-Jan FY 16 are actuals.

Employee Sustainability Opportunities

Solar Loan Program

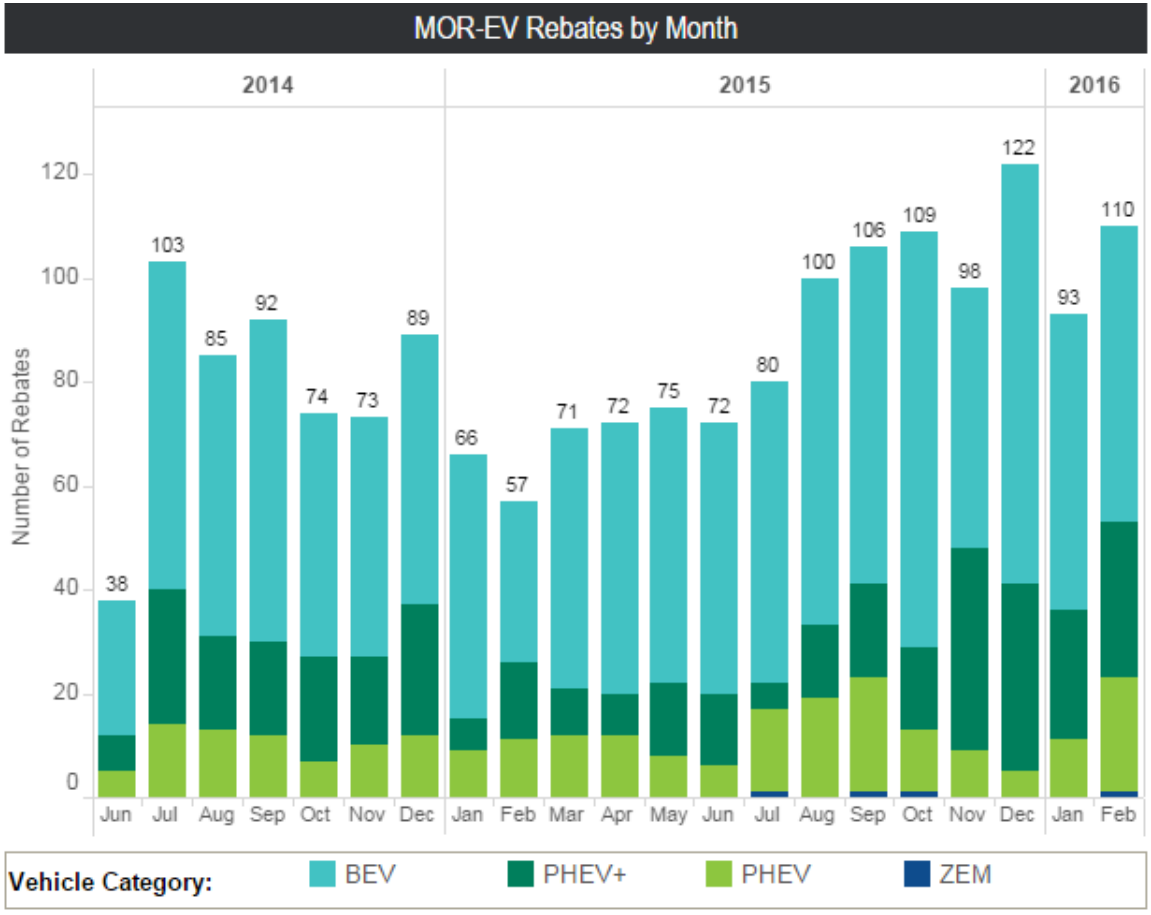
- $30 million program
- Supports MA lenders in providing low-interest and fixed-term loans
- Loans between $3,000-$60,000
- Approximately $100 million in projected savings

Source: MassCEC

Electric Vehicle Rebates

- $4.2 million in rebates reserved or issued
- 1,785 rebates (as of 3/1/16)
- Rebates up to $2500 (varies by vehicle)
- [mor-ev.org](mor-ev.org)

MOR-EV
Massachusetts Offers Rebates for Electric Vehicles



Residential Efficiency Programs

- MassSave will be offering:
  - Renter-specific audits and efficiency measure recommendations
  - New project-level lead contact enhancing initiatives programs for Multi-Family homes
  - Enhanced incentives for weatherization opportunities (e.g. insulation) for moderate income households (61-80% of state median income)

mass save®
Savings through energy efficiency

Discussion

- Do you inform others of private/individual opportunities?
- If yes, how do you do so and how can LBE support your efforts?
- If not, why not?

LBE Updates

VEH98: Statewide Vehicle Contract

- Over 500 light-duty vehicles including passenger cars, SUVs, Vans & Pickups

- More options for alternative fuels, battery electric and highly efficient gasoline vehicles
  - 7+ PHEV/BEV options
  - Small pickups, Small SUVs

Includes:
Chevrolet
Chrysler/Dodge/Jeep
Ford
Honda
Hyundai
Nissan
TBD: Toyota

Contract User Guide:
(http://www.mass.gov/anf/docs/osd/uguide/veh98.pdf)

VEH102: Alternative Transportation Technologies

- Replaces existing EVSE contract (RFR-ENE-2011-008)
- Expanded EVSE options and additional vehicle technologies
- Available Summer 2016

Category 1: Charging Stations

1a: Level 1 EVSE

1b: Level 2 EVSE

1c: DC Fast Charger (DCFC)

1d: Inductive Charging

Category 2: Idle Reduction

Category 3: After Market Conversion

Solar Canopy Feasibility Studies

- LBE worked w/ ICF to study the feasibility of solar canopies on parking lots at 18 state facilities, including Higher Ed (8), Tewksbury Hosp., & DCR (9)

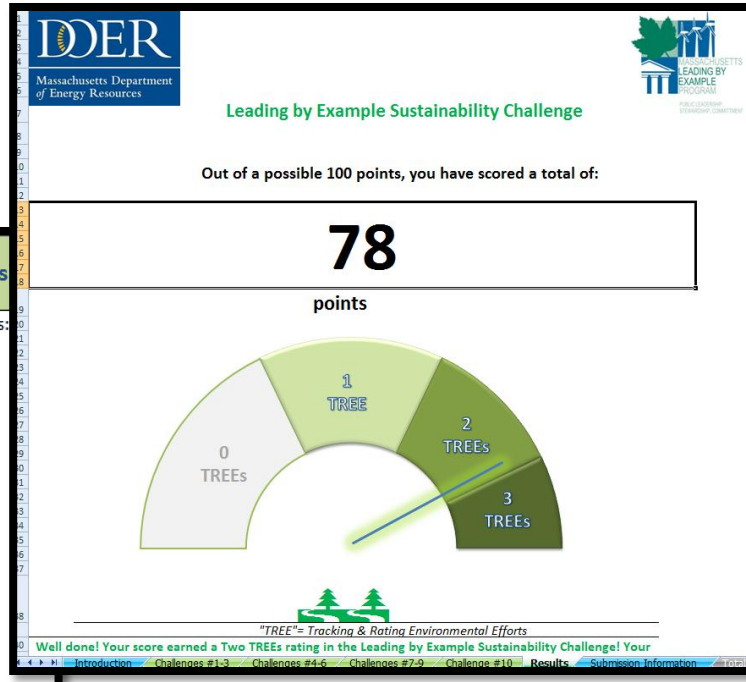
- Three Phases:
  - ✓Task 1 Complete (fatal flaw – 18/22 sites progressed)
  - ✓Task 2 – Complete (interconnection & net metering)
  - ✓Task 3 – Complete (cost & generation estimate)

- Next Steps:
  - Finish in person site briefings
  - Wait for new solar incentive program
  - Develop grant program
  - Create finance and procurement plan

ICF INTERNATIONAL®

Sustainability Challenge

Sustainability Challenge Topic
Challenge #1: Lighting reduction strategies
Challenge #2: Reduce plug loads
Challenge #3: Implement Computer Power Management
Challenge #4: Create an effective operations and maintenance program
Challenge #5: Promote paper reduction strategies
Challenge #6: Establish recycling and waste reduction programs
Challenge #7: Implement Environmentally Preferable Purchasing Program
Challenge #8: Implement alternative transportation strategies
Challenge #9: Create environmental awareness
Challenge #10: Innovate



Challenge #4: Create an effective Operations and Maintenance program (maximum of 11 points

Answer options:

1 Regularly monitor building schedules to ensure proper shut down for nights, weekends, school breaks, and holidays — Select

2 Stagger building start up(s) to reduce high peak demand charges — Select

3 Establish a written preventative maintenance protocol for facility equipment that includes **AT LEAST** the following elements: — Select

- Clean, calibrate, and inspect all systems frequently
- Replace HVAC filters on a schedule
- Clear vent areas so the air flow is not impeded
- Inspect windows and doors for signs of failing caulking or weather stripping, replace caulking and weather stripping when appropriate

Fact: Cleaning your boiler and replacing HVAC filters regularly can save you up to 30% on your energy bill.

Resources:

NEEP Regional Operations & Management Plan

ENERGY STAR Tools and Resources for Buildings

Challenge #5: Promote Paper Reduction Strategies (maximum of 7 points)

Answer options:

1 Set PC/printer settings to automatically print double-sided — Select

2 Set copier settings to automatically print copies double-sided — Select

*monwealth

DOER
Massachusetts Department of Energy Resources

MAFMA Preventative Maintenance Committee

- Developing recommendations for PM best practices/standards
- Includes recommended actions and frequency for:
  - Control systems
  - Plumbing systems
  - Life safety systems
  - Air filters and HVAC systems
  - Envelope systems
  - Electrical systems
- Contact: Francis.Tagan@state.ma.us

Facility Advisors and Energy Consulting Services Contract (PRF62)

PRF62 Service Category	Category 1. Energy Research and Analysis Services	Category 2. Clean Energy Systems and Technology Analysis and Research	Category 3. Energy Programs Stakeholder Engagement Services	Category 4. Energy Project Advisory & Consulting Services	Category 5. Existing Building Commissioning	Category 6. Facility Maintenance and Operations Advisory Services	Category 7. High Performance Buildings Advisory Services
Total Awards for each Service Category	41	39	33	47	39	22	31

- PRF62 now available for use
- Statewide Contract User Guide now available
- More information available on COMMBUYS

LEED Analysis: Background & Objective

Mass LEED Plus Requirements

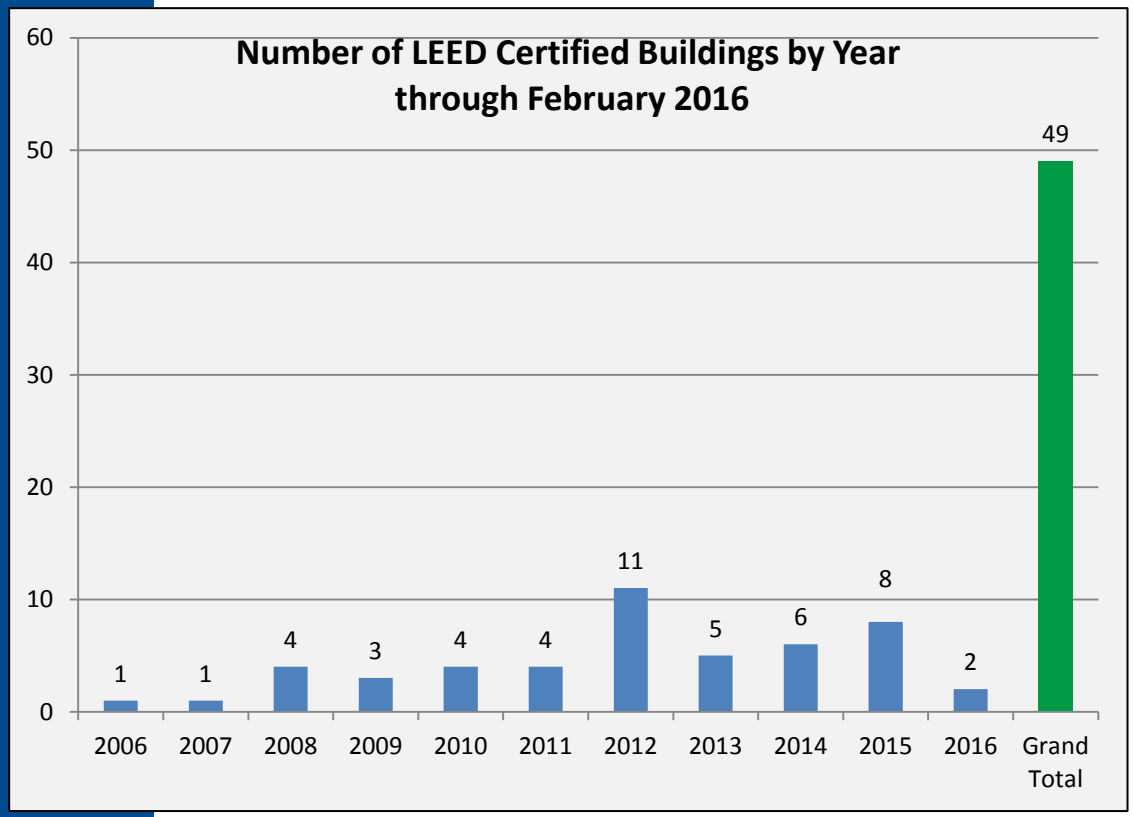
- **LEED Certification (buildings >20,000 sf)**
- **20% better energy performance than state building code**
- 3rd party commissioning
- 50% outdoor & 20% indoor water reduction over baseline projections
- Conformance with smart growth criteria

Objective of LEED Analysis → Analyze design & performance metrics of state-owned, LEED-certified buildings

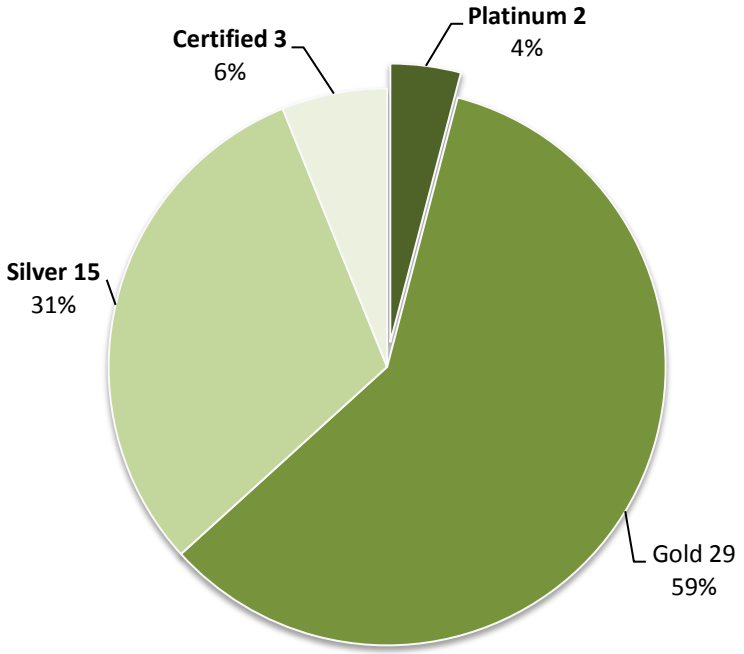
- Baseline EUI of Code Compliant Building
- Modeled EUI of Mass LEED Plus Building
- Actual EUI Performance

State-Owned LEED Building Portfolio

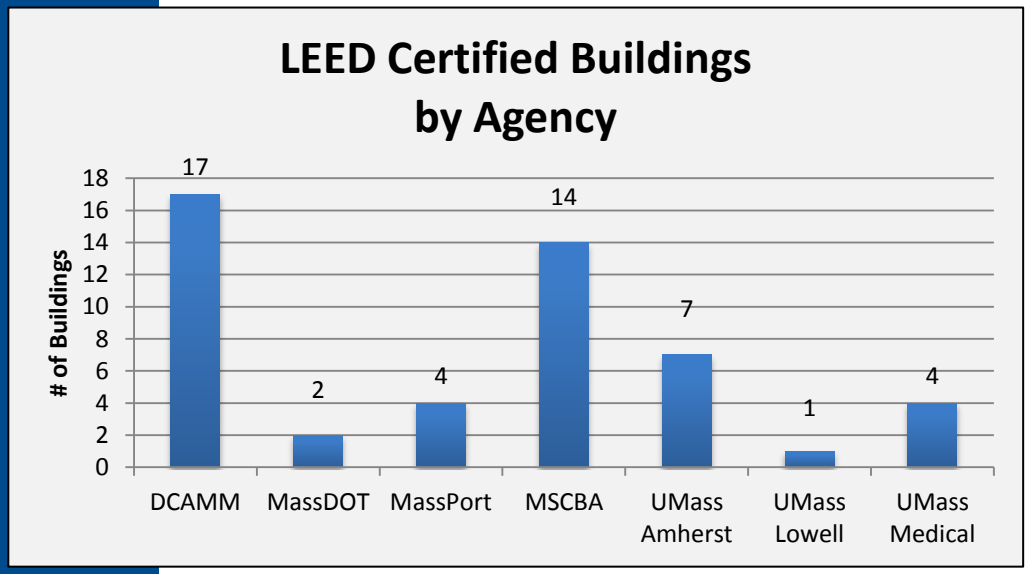
- **49 LEED certified buildings**
  - **65% at Gold or Platinum Levels**



LEED Buildings by Certification Level



LEED Buildings

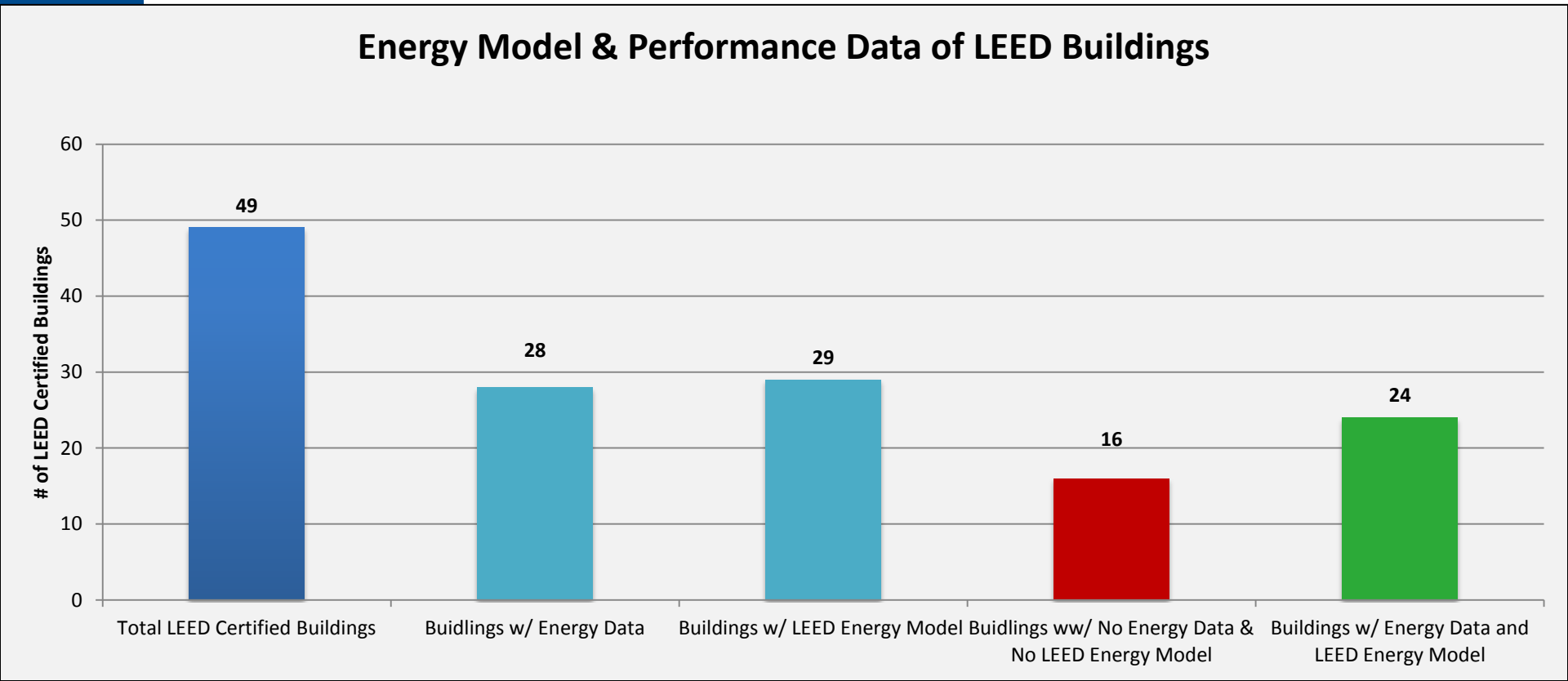


Type of Building	Number of LEED-certified Buildings
	Total
University & Community College	32
Student Housing	12
Administrative/Academic	7
Athletics/Fitness	3
Medical Buildings	4
Technology/Lab	3
Campus Police	1
Dining Hall	1
Greenhouse	1
Health & Wellness	1
Trial Courts	3
Data Centers	1
Airport Facilities	3
Fire Services	1
Hospital	1
Mass DEP Lab	1
DFW Headquarters	1
Military	1
Transportation	3
Youth Services Center	1
Total Number of Buildings	**49**

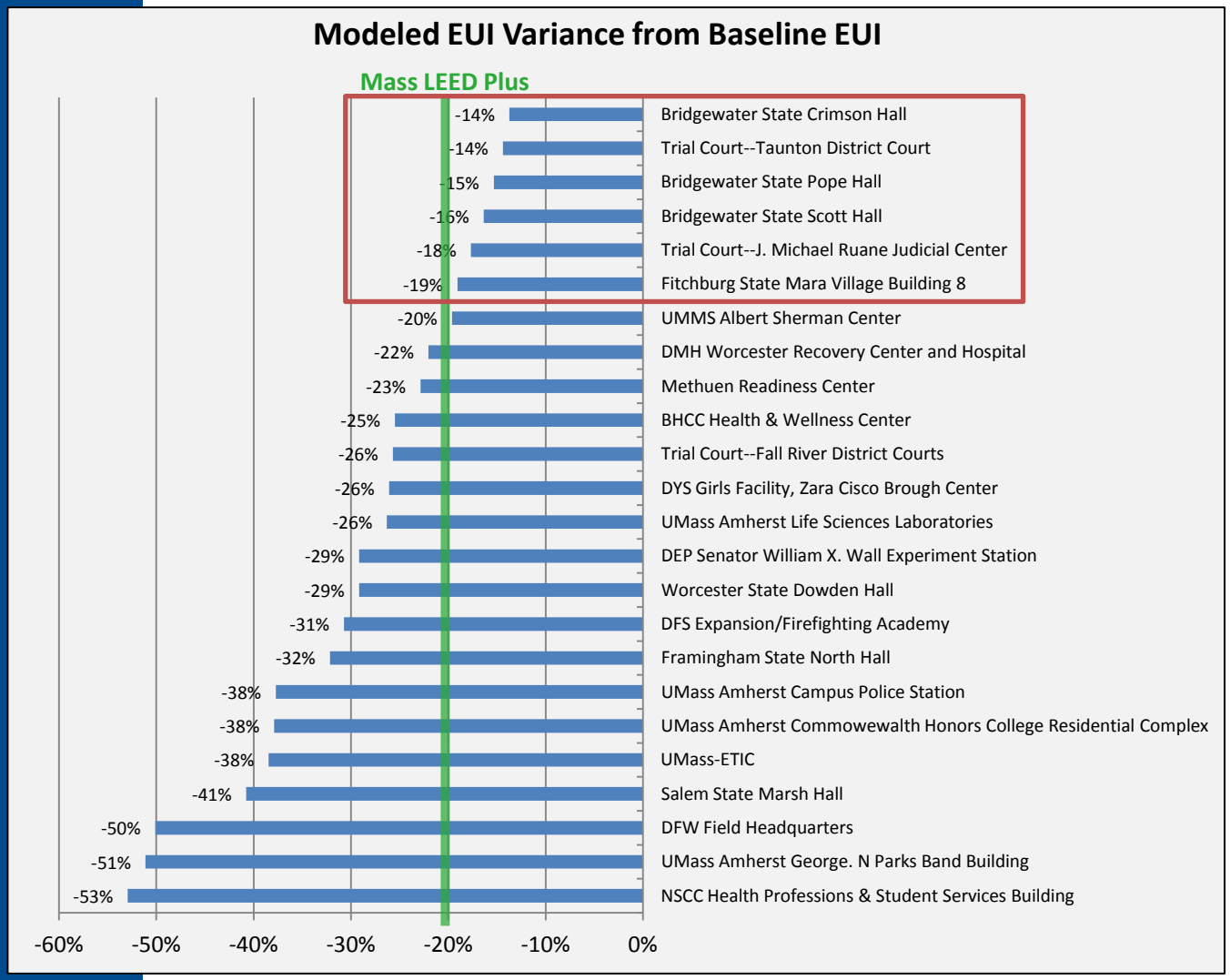
- **7 owner agencies** oversee and/or manage the portfolio of LEED certified buildings
- **Roughly 2/3** of LEED buildings fall within the portfolio **managed by state universities & community colleges**
  - 1/3 of these are residence halls
- Other facilities include trial courts, hospitals & laboratories managed by various state agencies

Analysis Challenges & Limitations

- Lack of access to LEED applications & model data
- Lack of building energy meter
- Delayed installation of meter
- Conflicting data from different sources
- Data anomalies
- Missing data



Mass LEED Plus: Design Compliance



- **24 buildings** included in analysis
- **18 designed to meet** Mass LEED Plus requirement
  - **9 attained 20-30%** reduction from baseline
  - **5 attained 30-40%** reduction from baseline
  - **1 attained 40-50%** reduction from baseline
  - **3 attained 50%+** reduction from baseline
- **6 fell short** of Mass LEED Plus requirement (14-19% reduction)

LEED Buildings: Performance

- LBE gathering and organizing performance data
- Will be working with buildings and owners to compare performance data against the model

Upcoming Events

- **Moving Toward Zero Waste in Office Settings Webinar**
  - March 10, 1-2:30pm, register here
- **Higher Education PEV Charging Webinar**
  - March 10, 3:30-4:30pm, register here
- **Sustainable Communities & Campuses Conference**
  - April 15-16 at Hampshire College & Northampton, register here
- **Earth Day: Just 45 days away!**
  - April 22